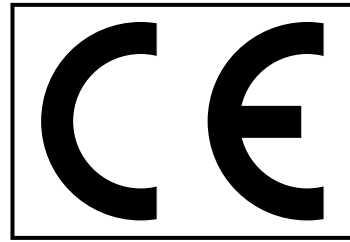




BSI 01
0100



0100

Amplicon products are designed and manufactured in the United Kingdom under a quality system approved by the British Standards Institution

MODEL 485F9i



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Amplicon Liveline Limited
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Model 485F9i Instruction Manual Part N° 859 932 24 Issue B2

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DECLARATION OF CONFORMITY

**AMPLICON LIVELINE LIMITED
CENTENARY INDUSTRIAL ESTATE
HOLLINGDEAN ROAD
BRIGHTON BN2 4AW UK**

We declare that the product(s) described in this Instruction Manual are manufactured by Amplicon Liveline Limited and perform in conformity with the following standards or standardisation documents:

Electro Magnetic Compatibility (EMC):

EMC Directive 89/336/EEC
LVD Directive 73/23/EEC
CE Directive 93/68/EEC



Jim Hicks, I. Eng, MIEIE
Managing Director
Amplicon Liveline Limited

Model 485F9i

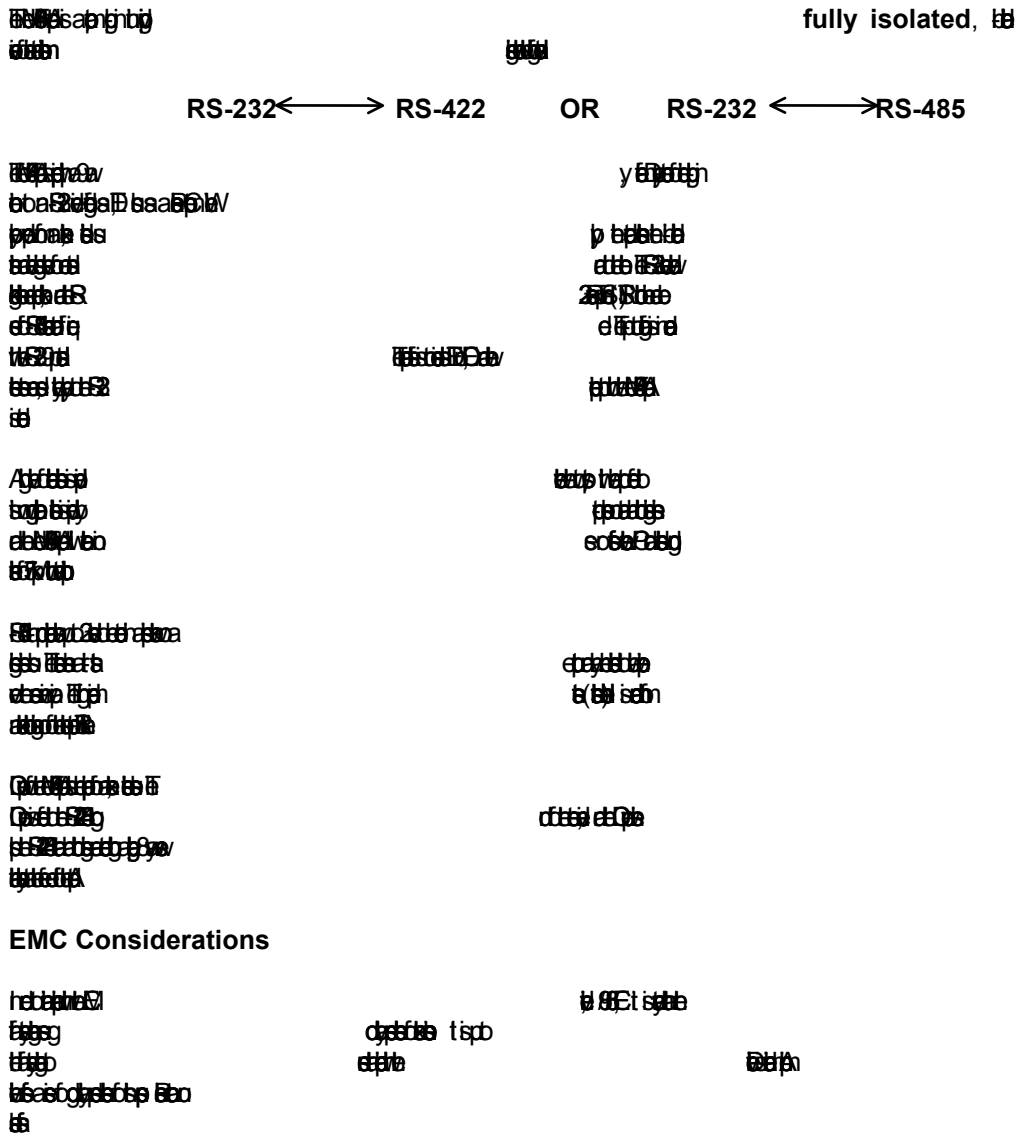
Opto-isolated RS-232 to RS-422/485 Adaptor

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1 INTRODUCTION

1.1 GENERAL DESCRIPTION



1.2 TECHNICAL FEATURES

- RS-232C
- RS-485
- 150V
- 1000m
- 100m
- 100m
- 100m
- 100m

1.3 IMPORTANT NOTES FOR EXISTING MODEL 485 USERS

1. **Read the instructions carefully before using the device.**
2. **Do not use the device if you are pregnant or breastfeeding.**
3. **Do not use the device if you have a pacemaker or other implanted medical device.**
4. **Do not use the device if you are taking any medication that may interact with the device.**

1.4 WHAT THE PACKAGE CONTAINS



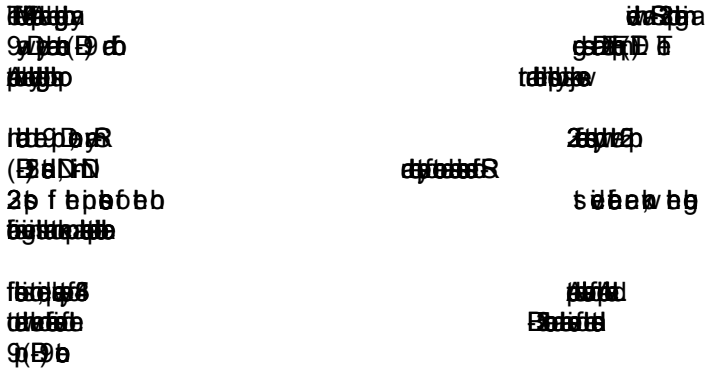
CAUTION

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1. **Do not use the device if you are pregnant or breastfeeding.**
 2. **Do not use the device if you have a pacemaker or other implanted medical device.**
- 00001000

2 INSTALLATION INSTRUCTIONS

2.1 REQUIREMENTS OF HOST EQUIPMENT



2.2 CONNECTIONS TO MODEL 485F9I ADAPTOR



2.2.1 RS-232 Connections on 9 way D Connector

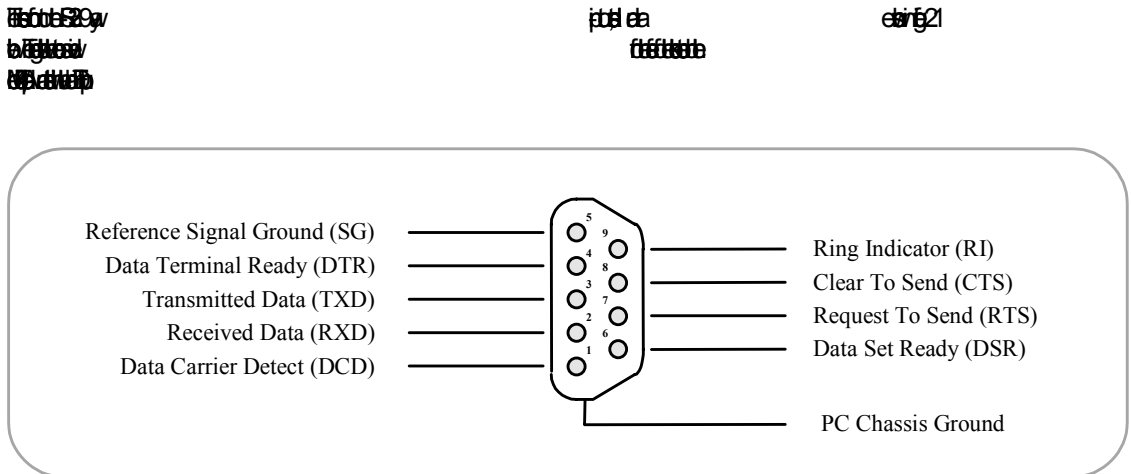


FIGURE 2.1 RS-232 CONNECTIONS

2.2.2 RS-422/485 Connections on 8 way Pluggable Terminal Strip

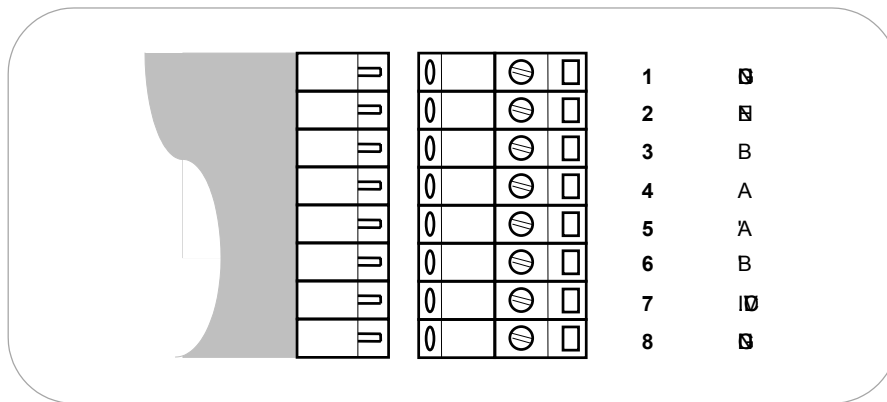
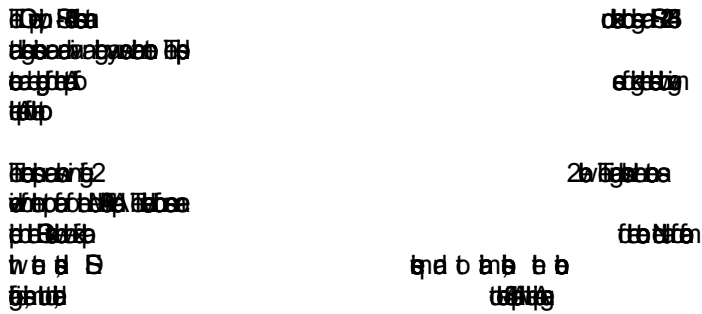


FIGURE 2.2 RS-422/485 CONNECTIONS

2.3 CONFIGURATION OF MODEL 485F9I ADAPTOR OPTIONS

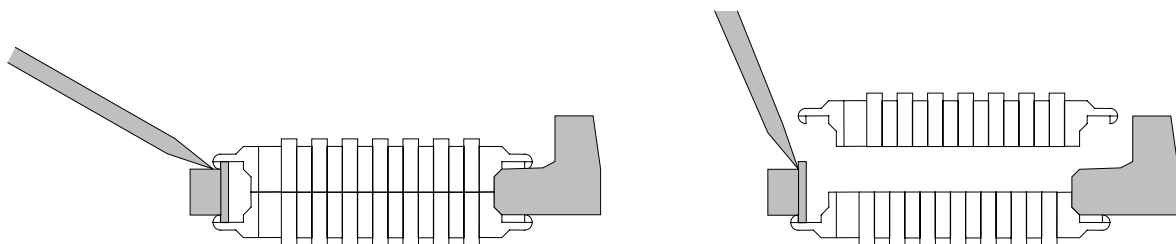


FIGURE 2.3 OPENING THE PLASTIC CASE

Figure 2.4

Figure 2.4

Link	Default Position	Default Function	Alternative Position	Alternative Function
K1	0	RTS	1	RTS
K2	0	RTS	1	RTS
K3	1	RTS	0	RTS
K4	0	RTS	1	RTS

Figure 2.4

Figure 2.4

Figure 2.4

Figure 2.4

Figure 2.4

Figure 2.4

Figure 2.4

Figure 2.4

Figure 2.4

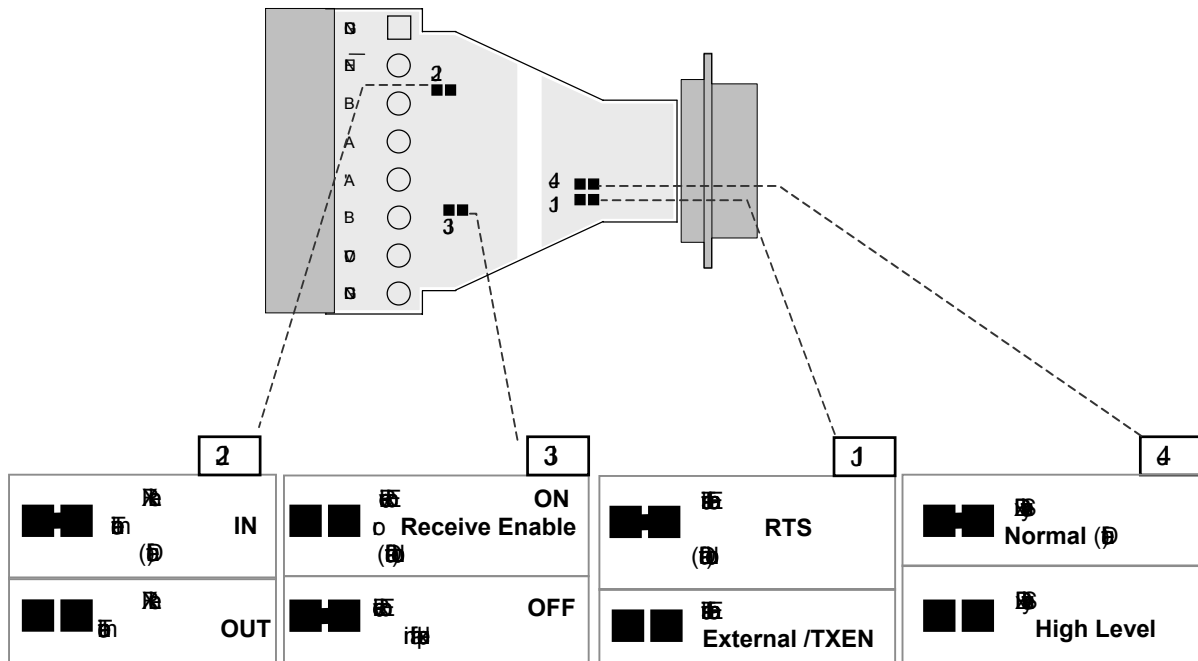
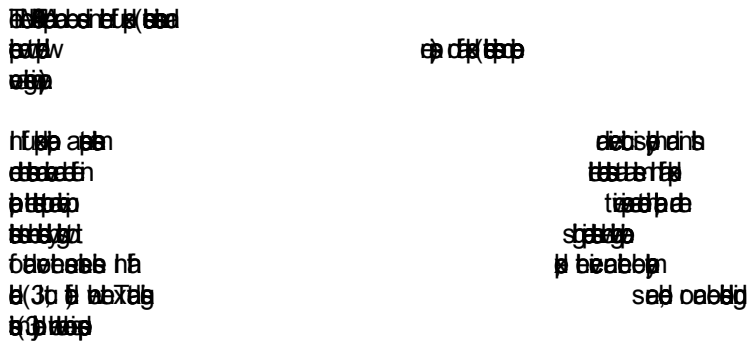


FIGURE 2.4 CONFIGURATION OPTIONS

2.4 FULL DUPLEX / HALF DUPLEX OPERATION



If half duplex working is required, then the following external and internal configuration changes must be considered.

2.4.1 Selection of Full/Half Duplex

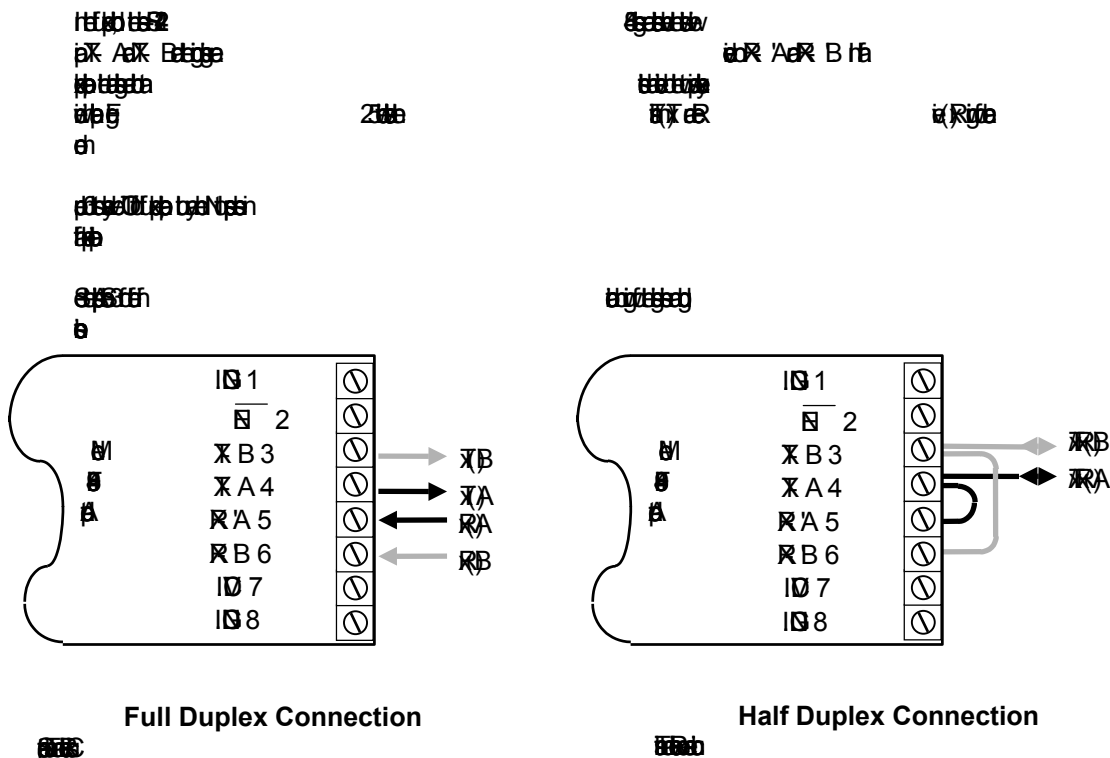


FIGURE 2.4 CONNECTIONS FOR FULL AND HALF DUPLEX OPERATION

2.5 SELECTION OF TRANSMIT ENABLE CONTROL SIGNAL

External TXEN. The TXEN pin is active low. It is normally high and is pulled up to VCC. It is driven low to enable the transmitter.

RTS. The RTS pin is active low. It is normally high and is pulled up to VCC. It is driven low to enable the transmitter.

- External TXEN. The TXEN pin is active low. It is normally high and is pulled up to VCC. It is driven low to enable the transmitter.



RTS. The RTS pin is active low. It is normally high and is pulled up to VCC. It is driven low to enable the transmitter.

RTS

VCC (10V) 10V

$V_{CC} > 0.8V$
 $V_{CC} > +3V < +20V$ $V_{CC} < 4.6V$
 An

TXEN pin is active low. It is normally high and is pulled up to VCC. It is driven low to enable the transmitter.

TXEN

TXEN

TXEN

TXEN pin

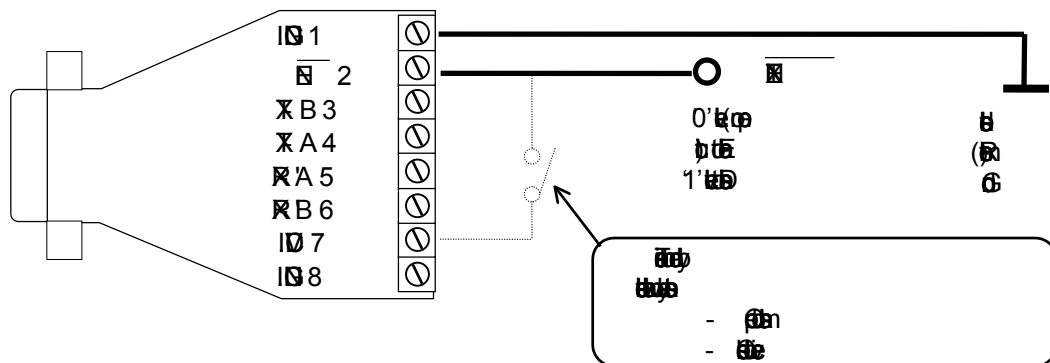


FIGURE 2.5 EXTERNAL TRANSMITTER ENABLE CONNECTIONS

- RTS Transmit Enable. The RTS pin is active low. It is normally high and is pulled up to VCC. It is driven low to enable the transmitter.

RTS. The RTS pin is active low. It is normally high and is pulled up to VCC. It is driven low to enable the transmitter.

RTS. The RTS pin is active low. It is normally high and is pulled up to VCC. It is driven low to enable the transmitter.

RTS. The RTS pin is active low. It is normally high and is pulled up to VCC. It is driven low to enable the transmitter.

```

regs=inp(BA+4)      'Input register contents
regs=regs OR &H02   'Force bit 2 high for transmit
regs=regs XOR &H02  'Force bit 2 low for receive
out(BA+4),regs      'Output to modem register
    
```

```

regs=inp(BA+4)      'Input register contents
regs=regs OR &H02   'Force bit 2 high for transmit
regs=regs XOR &H02  'Force bit 2 low for receive
out(BA+4),regs      'Output to modem register
    
```

2.6 TRANSMISSION LINE TERMINATION

```

regs=inp(BA+4)      'Input register contents
regs=regs OR &H02   'Force bit 2 high for transmit
regs=regs XOR &H02  'Force bit 2 low for receive
out(BA+4),regs      'Output to modem register
    
```

2.6.1 Network Biasing Resistors

```

regs=inp(BA+4)      'Input register contents
regs=regs OR &H02   'Force bit 2 high for transmit
regs=regs XOR &H02  'Force bit 2 low for receive
out(BA+4),regs      'Output to modem register
    
```


1. Connect the
 power supply
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 as follows:

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2.8.1 Connecting the Amplicon Mains Adaptors

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2.9 SOFTWARE INSTALLATION

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2.10 INSTALLATION TESTING

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3 APPLICATION INFORMATION

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විවිධ

අවම වශයෙන්

අවම වශයෙන්
විදුලි බලය
විවිධ

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3.1 WHY ISOLATE?

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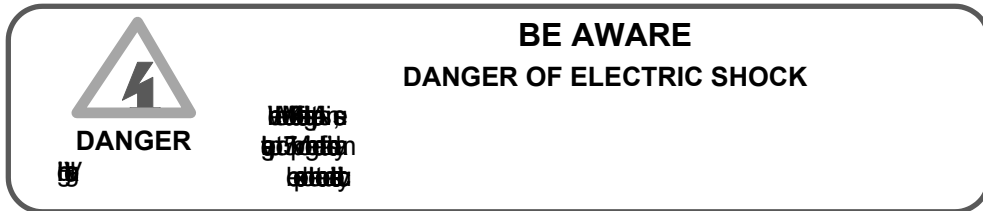
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BE AWARE THAT THE EXTERNAL POWER SUPPLY USED WITH THE 485F9i ADAPTOR MUST ALSO BE CAPABLE OF WITHSTANDING THE HIGH POTENTIAL DIFFERENCE. ≈ 100 V

3.2 APPLICABLE STANDARDS

IEEE Std 485-1980 IEEE Standard for Serial Binary Data-Exchange Between Data Terminal Equipment and Data Communication Equipment Employing Serial Data Interchange	IEEE Std 645-1984 IEEE Standard "Interface Between Data Terminal Equipment and Data Communication Equipment Employing Serial Data Interchange".
IEEE Std 1489-1997 IEEE Standard "Electrical Characteristics of Balanced Voltage Digital Interface Circuits".	
IEEE Std 1491-1997 IEEE Standard "Electrical Characteristics of Unbalanced Voltage Digital Interface Circuits".	
IEEE Std 1493-1997 IEEE Standard "Electrical Characteristics of Unbalanced Voltage Digital Interface Circuits".	

3.3 RS-232 APPLICATION NOTES

RS-232C Serial Binary Data-Exchange Between Data Terminal Equipment and Data Communication Equipment	IEEE Std 485-1980 IEEE Standard for Serial Binary Data-Exchange Between Data Terminal Equipment and Data Communication Equipment Employing Serial Data Interchange
---	--

3.3.1 Electrical Levels

RS-232C Serial Binary Data-Exchange Between Data Terminal Equipment and Data Communication Equipment	IEEE Std 485-1980 IEEE Standard for Serial Binary Data-Exchange Between Data Terminal Equipment and Data Communication Equipment Employing Serial Data Interchange
---	--

1. 25-pin D-sub connector
 2. 9-pin D-sub connector
 3. 25-pin D-sub connector
 4. 9-pin D-sub connector
 5. 25-pin D-sub connector
 6. 9-pin D-sub connector
 7. 25-pin D-sub connector
 8. 9-pin D-sub connector
 9. 25-pin D-sub connector
 10. 9-pin D-sub connector

1. 25-pin D-sub connector
 2. 9-pin D-sub connector
 3. 25-pin D-sub connector
 4. 9-pin D-sub connector
 5. 25-pin D-sub connector
 6. 9-pin D-sub connector
 7. 25-pin D-sub connector
 8. 9-pin D-sub connector
 9. 25-pin D-sub connector
 10. 9-pin D-sub connector

1. 25-pin D-sub connector
 2. 9-pin D-sub connector
 3. 25-pin D-sub connector
 4. 9-pin D-sub connector
 5. 25-pin D-sub connector
 6. 9-pin D-sub connector
 7. 25-pin D-sub connector
 8. 9-pin D-sub connector
 9. 25-pin D-sub connector
 10. 9-pin D-sub connector

1. 25-pin D-sub connector

1. 25-pin D-sub connector

3.3.2 9/25 way Adaptors

1. 25-pin D-sub connector
 2. 9-pin D-sub connector
 3. 25-pin D-sub connector
 4. 9-pin D-sub connector
 5. 25-pin D-sub connector
 6. 9-pin D-sub connector
 7. 25-pin D-sub connector
 8. 9-pin D-sub connector
 9. 25-pin D-sub connector
 10. 9-pin D-sub connector

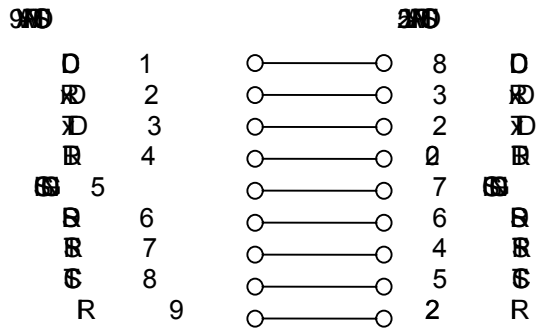


FIGURE 3.2 DTE ADAPTOR - 9 WAY TO 25 WAY

3.4 RS-422/485 APPLICATION NOTES

1. 25-pin D-sub connector
 2. 9-pin D-sub connector
 3. 25-pin D-sub connector
 4. 9-pin D-sub connector
 5. 25-pin D-sub connector
 6. 9-pin D-sub connector
 7. 25-pin D-sub connector
 8. 9-pin D-sub connector
 9. 25-pin D-sub connector
 10. 9-pin D-sub connector

1. 25-pin D-sub connector
 2. 9-pin D-sub connector
 3. 25-pin D-sub connector
 4. 9-pin D-sub connector
 5. 25-pin D-sub connector
 6. 9-pin D-sub connector
 7. 25-pin D-sub connector
 8. 9-pin D-sub connector
 9. 25-pin D-sub connector
 10. 9-pin D-sub connector

3.4.1 RS-422/485 Signalling Sense

1. 25-pin D-sub connector
 2. 9-pin D-sub connector
 3. 25-pin D-sub connector
 4. 9-pin D-sub connector
 5. 25-pin D-sub connector
 6. 9-pin D-sub connector
 7. 25-pin D-sub connector
 8. 9-pin D-sub connector
 9. 25-pin D-sub connector
 10. 9-pin D-sub connector

1. 25-pin D-sub connector

1. 25-pin D-sub connector

- a. 25-pin D-sub connector (RD)
- b. 25-pin D-sub connector (XD)

1. 25-pin D-sub connector
 2. 9-pin D-sub connector
 3. 25-pin D-sub connector
 4. 9-pin D-sub connector
 5. 25-pin D-sub connector
 6. 9-pin D-sub connector
 7. 25-pin D-sub connector
 8. 9-pin D-sub connector
 9. 25-pin D-sub connector
 10. 9-pin D-sub connector

1. 25-pin D-sub connector
 2. 9-pin D-sub connector
 3. 25-pin D-sub connector
 4. 9-pin D-sub connector
 5. 25-pin D-sub connector
 6. 9-pin D-sub connector
 7. 25-pin D-sub connector
 8. 9-pin D-sub connector
 9. 25-pin D-sub connector
 10. 9-pin D-sub connector

RS-422/485
cable length

typical

bus length

length

3.4.2 RS-422/485 Parameters

typical
cable length

typical

EIA STANDARD	RS-232	RS-422-B	RS-485
bits	10	10	10
baud	10	10	10
length	15m	120 m	120 m
length	0	10	10
length	NA	+7/V	+12/V
length	5/1.5/	2/m	1.5/m
length	3k Ω to 7k Ω	100 Ω m	6 Ω m
length	0 Xs	NA	NA
length	60 A	16 A	16 A
length	NA	6	6 A
length	3k Ω to 7k Ω	4k Ω	12k Ω
length	3/	20 m	20 m
length	1.15/	6 m	6 m

FIGURE 3.3 STANDARD RS-232/422/485 PARAMETERS

3.4.3 Cabling of RS-422/485 Bus

typical
bus length
in this case
typical
bus length
typical

typical
bus length
typical
bus length
typical

typical
Typical
bus length

typical
bus length

RS-422

RS-485

Up to 100 kBd
115.3 kBd
1000 kBd
10000 kBd

1200 m
1000 m
100 m
10 m

typical
bus length
typical

typical

typical

3.4.4 Multi-drop Applications

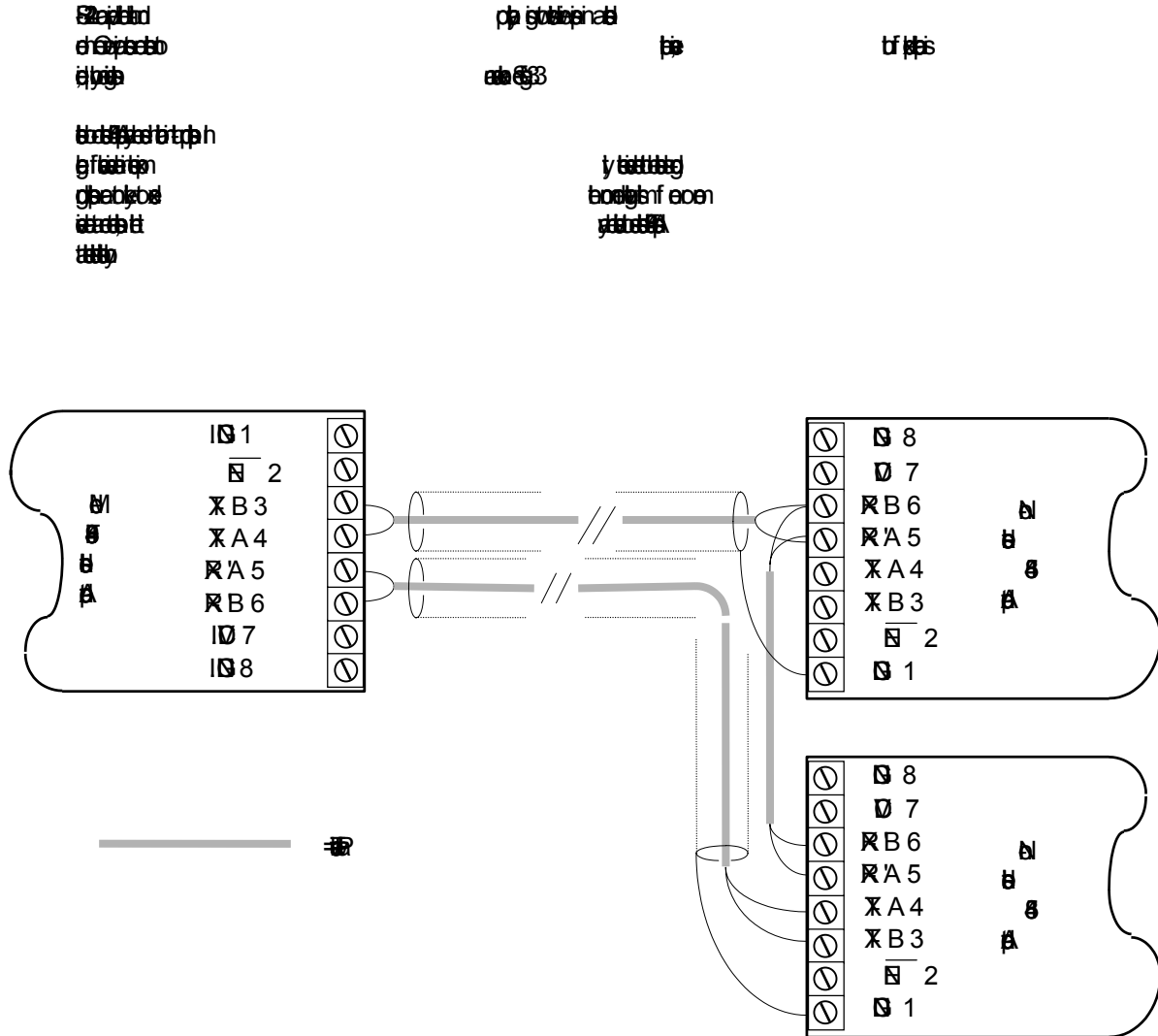


FIGURE 3.4 RS-422 CONNECTED IN BROADCAST MODE

AMPLICON
LIVELINE
SERIES
RS-422
RECEIVER

AMPLICON
LIVELINE
SERIES
RS-422
TRANSMITTER

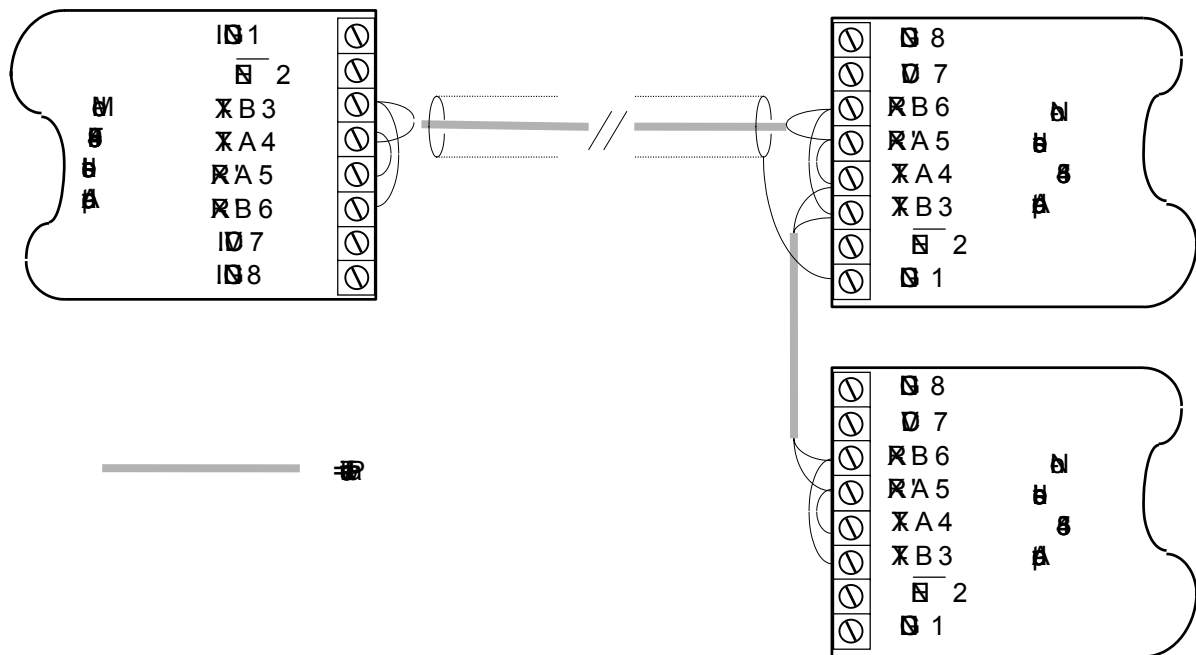


FIGURE 3.5 RS-485 CONNECTED IN MULTI-DROP, HALF DUPLEX MODE

1
 2
 XB3
 XA4
 RA5
 RB6
 7
 8

8
 7
 RB6
 RA5
 XA4
 XB3
 2
 1

8
 7
 RB6
 RA5
 XA4
 XB3
 2
 1

8
 7
 RB6
 RA5
 XA4
 XB3
 2
 1

3.4.5 Bus Termination

1
 2
 XB3
 XA4
 RA5
 RB6
 7
 8

8
 7
 RB6
 RA5
 XA4
 XB3
 2
 1

8
 7
 RB6
 RA5
 XA4
 XB3
 2
 1

8
 7
 RB6
 RA5
 XA4
 XB3
 2
 1

4 TESTING AND TROUBLESHOOTING

4.1 BASIC TESTING AND FAULT ISOLATION



4.1.1 Testing with the Application Software



4.1.2 Testing with the supplied software

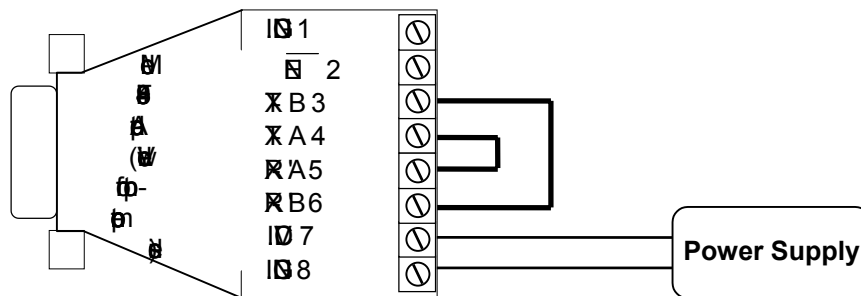
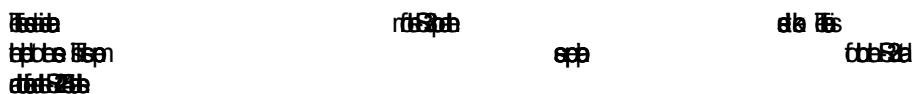


FIGURE 4.1 TERMINAL LINKS FOR LOOP-BACK TEST



- J1 (Jumper out) External Tx Enable
- J2 (Link made) Terminator Resistor In
- J3 (Jumper out) Echo ON
- J4 Set as appropriate for host RS-232 device (see para 2.8)



4.1.3 Further Investigations

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Communication circuits

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Hardware handshaking control signals

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16200000

Data Terminal Ready (DTR) and/or Request To Send (RTS) control lines are ON (high).

Polarity of RS-422/485 differential data lines

16200000
16200000
16200000
16200000

16200000
16200000

A 0
B 0

A 0 A' 0 Y 0 High 0 +
B 0 B' 0 Z 0 Low 0 -

16200000
16200000
16200000

16200000

Termination of Data and Control Lines

16200000

16200000

5 TECHNICAL INFORMATION

5.1 TECHNICAL SPECIFICATION

Except where otherwise noted, all specifications are typical at 25° C

Except where otherwise noted, all specifications are typical at 25° C

5.1.1 Electrical Specification

Supply Voltage	+5V	Supply Current	10-14 mA
Input Impedance	>100 kΩ	Output Impedance	<100 Ω
Input Voltage Range	0 V to +5 V	Output Voltage Range	0 V to +5 V
Input Voltage Accuracy	±1.0 V	Output Voltage Accuracy	±0.5 V
Input Voltage Resolution	0.2 V	Output Voltage Resolution	0.1 mV
Input Voltage Hysteresis	1.5 mV	Output Voltage Hysteresis	2 Ω
Input Voltage Linearity	10	Output Voltage Linearity	Ω in
Input Voltage Temperature Coefficient	±0.8 V/°C	Output Voltage Temperature Coefficient	±0.5 V/°C
Input Voltage Load Regulation	±0.8 V	Output Voltage Load Regulation	±0.8 V
Input Voltage Power Consumption	10 mA	Output Voltage Power Consumption	20 mA
Input Voltage Storage Temperature	0°C to 70°C	Output Voltage Storage Temperature	0°C to 70°C

5.1.2 Physical/Environmental Specification

Dimensions	25.4 mm	25.4 x 8 mm
Weight	0.5 g	0.5 g
Operating Temperature	0°C to 70°C	-20 to 70°C

5.2 CIRCUIT DETAILS

<p>RS-232C Data Rate</p> <p>RS-232C Data Rate</p>	<p>to be paid to</p> <p>to be paid</p>
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5.2.1 Component Layouts

<p>to be paid</p>	<p>to be paid</p>
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5.2.2 Circuit Operation

<p>Function</p>	<p>to be paid to</p>	
<p>Isolation</p>	<p>to be paid to to be paid to</p>	<p>to be paid</p>
<p>RS-232 Power</p>	<p>to be paid to to be paid to to be paid to</p>	<p>to be paid to</p>
<p>RS422/485 Power</p>	<p>to be paid to to be paid to</p>	<p>to +5 V to be paid</p>
<p>Hardware Handshaking</p>	<p>to be paid to to be paid to</p>	<p>to be paid</p>
<p>Transmission Turnaround</p>	<p>to be paid to to be paid to to be paid to</p>	
<p>Echo</p>	<p>to be paid to to be paid to</p>	<p>to be paid to</p>

FIGURE 5.1 MODEL 485F9I LAYOUT

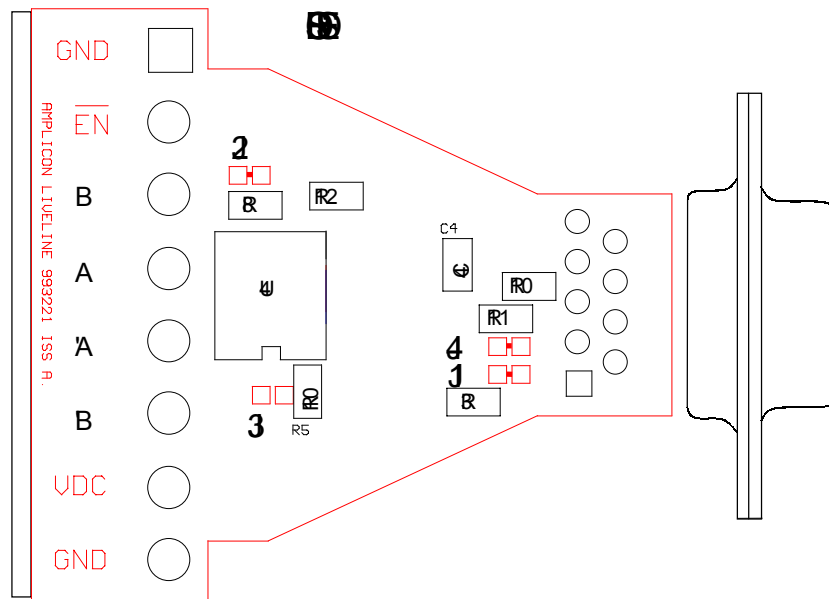
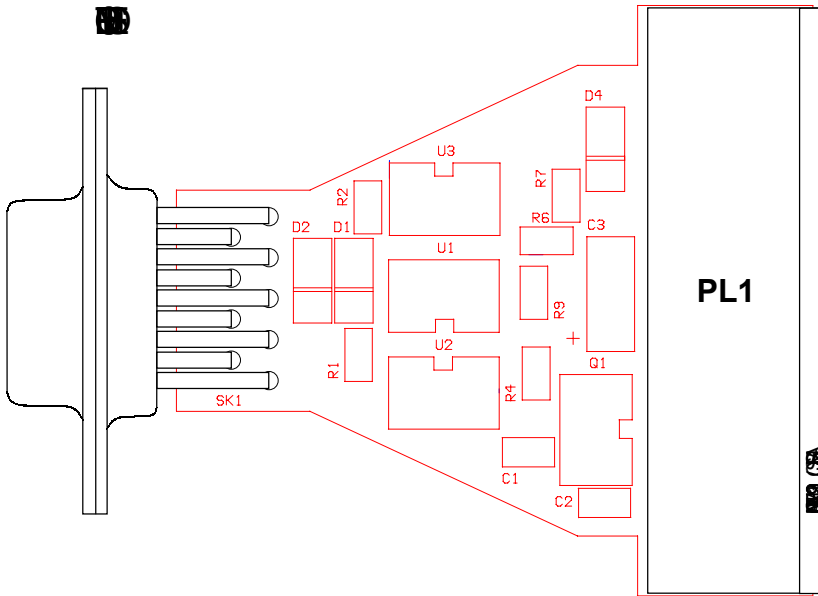


FIGURE 5.2 MODEL 485F9I PRINTED CIRCUIT BOARD LAYOUT